

A TACTICAL GAME OF SURFACE COMBAT IN THE PACIFIC, 1941-45

WARSHIP™



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1.0 INTRODUCTION

WARSHIP is a game of tactical-level naval combat between Japanese and Allied ships from 1941 to 1945.

1.1 Description of Action

Each game turn consists of two phases. In the orders phase, the players, one at a time, give orders to the ships that they control. In the action phase all ships will carry out their orders. During the action phase, ship and torpedo movement will be updated every 30 seconds; searches and gunfire will be resolved every 2 minutes. Players may interrupt the action phase after each two-minute period to modify their orders or check the status of their ships.

1.2 Starting a Game (Apple)

To begin the game, boot the game disk and the game will begin automatically. If you are using an Apple III you must first go into Apple II emulation mode.

1.3 Starting a Game (C-64)

To begin the game, insert the game disk into your disk drive. Type: LOAD("*.8 and press <RETURN>. When READY appears, type RUN and press <RETURN>.

1.4 Starting a Game (Atari)

To begin the game, boot the Scenario side of your disk. Before beginning, remove all cartridges from your computer. Owners of the 800XL will have to hold down the OPTION key when they turn on their computer to boot the game. After you have selected the starting conditions for the game, the computer will ask you to insert the Game side of your disk.

1.5 Saving a Game

At the end of the deployment phase and before each orders phase, the computer will allow the players to save the game in progress. You will need a scratch disk to store the save game data. Save game disks may be initialized for SSI use during a game by following instructions included in the game program. Each save game disk holds from 5-7 games. *WARNING: The program will not inform you when you have exceeded the disk space on your save game disk.* Once a game is saved, you will be able to restart it at the point you left off.

WHEN RESTARTING A SAVED GAME, YOU MUST SET THE CORRECT NUMBER OF PLAYERS ON THE OPENING MENU.

1.6 The Map

The WARSHIP map is a 60 × 60 square grid with each square measuring 1000 yards across. Players may elect to fight their battles on an open sea map, on a Savo Sound map, or on a custom map that the players design themselves.

1.7 Sound

During the action phase, the players may toggle the sound on/off by pressing the <S> key.

2.0 GENERAL DESCRIPTION

2.1 Parts Inventory

- a. Game box
- b. Rulebook
- c. Game disk

2.2 Abbreviations

Abbreviations used in the game are listed below:

BB	battleship
BC	battlecruiser
CA	heavy cruiser
CL	light cruiser
CLAA	anti-aircraft cruiser
DD	destroyer
DE	destroyer escort
AK	cargo ship

3.0 STARTING THE GAME

3.1 Determining Conditions of Play

At the start of the game the players must determine the conditions under which the game will be played. On the Apple version the conditions may be changed by entering the following numbers:

- (1) NEW GAME or SAVED GAME
- (2) 1 DISK DRIVE or 2 DISK DRIVES
- (3) SOLITAIRE or TWO PLAYERS
- (4) HANDICAP LEVEL
- (5) DELAY LENGTH
- (6) SELECT SCENARIO

On the Atari and C-64 versions:

- (1) NEW GAME or SAVED GAME
- (2) SOLITAIRE or TWO PLAYERS
- (3) HANDICAP LEVEL
- (4) DELAY LENGTH
- (5) SELECT SCENARIO

3.2 Player Determination

WARSHIP may be played by either zero, one or two players, and this is determined by the option selected on the opening menu. For example, if you wished to watch a computer controlled Japanese force fight a computer controlled Allied force, you should select the option BOTH COMPUTER.

3.3 Handicap Level

At the start of the game the players must determine the handicap level (1-5). The effects of the handicap levels are listed below:

- | | |
|---------|-------------------------------|
| Level 1 | Allied strength reduced 20% |
| Level 2 | Allied strength reduced 10% |
| Level 3 | No reduction |
| Level 4 | Japanese strength reduced 10% |
| Level 5 | Japanese strength reduced 20% |

A player's 'strength' is reduced by lowering the number of ship selection points that he may use to buy his force. The handicap does not affect play of the historical scenarios.

3.4 Delay Length

The delay length affects the messages displayed during the action phase. The greater

the delay length the longer these messages will remain displayed. A delay length of 1 will greatly speed up the game but will cause some messages to be virtually unreadable. A delay length of 9 will slow the game considerably, but will allow the player maximum time to study the various reports provided during the action phase. No delay will be provided after the display of non-penetrating hits during the action phase.

3.5 Selecting a Scenario

You may select one of 4 historical scenarios (see 14.0), or you may elect to build your own scenario. If you select a historical scenario, the computer will skip the deployment phase and go directly to the orders phase to start the game.

If you elect to build your own scenario, you will be asked several questions regarding the time and conditions of battle (see 4.0).

New players are advised to begin by playing scenarios they have created themselves. Creating and playing a small battleline scenario on an open sea map is recommended.

4.0 BUILDING SCENARIOS

When building scenarios the players must answer questions regarding the time and conditions of battle. Players will have the option of selecting/buying the ships or allowing the computer to automatically select an appropriate force.

4.1 Selecting the Battle Area Map

Players have the option of selecting:

1. Open Sea
2. Savo Sound
3. Custom Map

Open Sea

A 60 × 60 square grid with no land masses. When playing battleline scenarios on an open sea map, the map will attempt to shift to prevent ships from sailing off the edge.

Savo Sound

A 60 × 60 map including Savo Island in the center, Guadalcanal in the south and Florida Island in the northeast. Five major surface actions were fought in this area during the latter months of 1942.

Custom Map

The player may recall a custom map that he previously constructed and stored on a scratch disk (see 15.0).

4.2 Build Scenario or Design Map

Players wishing to design a new map or modify an existing custom map should select the (D) option. To build a new custom map the player should have selected the open sea option in 4.1. To modify an existing custom map the player should have recalled the appropriate custom map in 4.1. Instructions for constructing custom maps are described in 15.0.



4.3 Setting the Time and Date of Battle

Players may adjust the time and date of battle by using the following menu options:

(Y)EAR from 1941 to 1945
(M)ONTH
(D)AY
(H)OUR
(U)MINUTE
(A)CCEPT DISPLAYED TIME/DATE

The year selected will determine the availability of various ship classes and the availability and quality of radar on the ships. The hour selected will determine if day, night, dawn or dusk visibility conditions are in effect.

DAWN 500 to 559
DAY 600 to 1759
DUSK 1800 to 1859
NIGHT 1900 to 459

4.4 Set Game Length

The players may select a game length of either 1, 2, 3, or 4 hours. It is recommended that at least 2 hours be allowed for battles where the opposing forces start out of contact. When the game ends, players may elect to continue the game if they so desire. If a game is continued, the computer will stop the game after 30 additional minutes have been completed.

4.5 Set Visibility Level (VL)

A visibility level from 1 to 9 may be selected. A VL of 1 would represent poor visibility conditions such as fog while a VL of 9 would represent excellent visibility conditions.

The VL is used in conjunction with the time of day to determine the range at which ships may sight each other.

4.6 Air Control Over Battle Area

Air control over the battle area may be either Allied, Japanese or Neutral. If a player has air control then his opponent will score fewer points for damaging ships. In the historical scenarios, the Allied player automatically has air superiority.

4.7 Set Damage Control Levels

Damage control abilities must be set for both the Japanese and Allied forces. A number from 1 to 4 must be selected for each player. The higher the number selected the better the players' ships will be at repairing damage and putting out fires. In the historical scenarios, Japanese damage control is always set at 2, while Allied damage control is always set at 3. These are considered to be the historical values.

4.8 Selecting the Type of Action

The players may select from 5 different types of battle:

Japanese Transport

The Japanese player scores points for 'exiting' cargo loaded ships off the east map edge. Both players score points for damaging or sinking enemy ships. The Japanese player may designate any of his ships to carry cargo but the Allied player scores

double points for damaging or sinking these ships.

Japanese Bombardment

The Japanese player scores points for exiting combat ships off the east map edge. Both players score points for damaging or sinking enemy ships. Points scored for exiting is determined by the size and number of main guns on the ship.

Battleline

Players score points only for damaging or sinking enemy ships.

Allied Bombardment

The Allied player scores points for exiting combat ships off the west edge of the map. Both players score points for damaging enemy ships.

Allied Transport

The Allied player scores points for exiting cargo ships (AK only) off the west edge of the map. Both players score points for damaging or sinking enemy ships.

4.9 Selecting a Large or Small Battle

The number of ship selection points (SSPs) that a player may use to buy his force is determined by the type of action and the size (large or small) of the battle. Listed below are SSPs provided for each type of battle:

	LARGE	SMALL
Transport	480/400	240/200
Bombardment	360/320	180/160
Battleline	1200	600

When two numbers divided by a '/' are shown, the first number is the number for the player attempting to exit ships and the second number is for his opponent.

When selecting small bombardment or transport type actions the players may not include battleships or battlecruisers in their forces.

The SSPs shown above are for battles fought at handicap level 3 (see 3.3).

4.10 Selecting Ships

The Allied player may select from 53 different American, British and Dutch ships. The Japanese player may select from 27 different ship classes. If the auto-select option is used then the computer will select a force to suit the type of battle. When using auto-select the computer will sometimes exceed the SSP limit (this will happen when selecting both human and computer forces).

The computer will only allow the selection of ships that were available during the year selected as the time of the battle. The computer will decide the radar level for each ship based on the year of the scenario and a random factor. No points are awarded for unused SSPs, so the players should find a way to spend them all. Each player is limited to selecting a maximum of twenty ships.

5.0 DEPLOYMENT PHASE

During the deployment phase, the players may alter the starting location, speed, and

facing of their ships. Also, utilities may be employed to designate ships as 'transports', change their starting division, rename the ship and even alter the ship's characteristics (such as number of guns, radar, speed, etc.). The computer will never alter its automatically generated deployment, and will never modify a ship. When playing a scenario against the computer, you should accept the deployment created by the computer. Players may agree between themselves on allowed deployment changes.

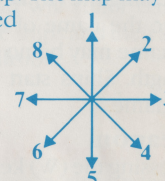
If you have created a map, be sure to check the deployment of both sides' forces; otherwise, they may be deployed on land.

5.1 Map Menu

The deployment phase starts with the map menu displayed in the text window below the map display. The following items are included on the menu:

(1-8) Move cursor

By pressing the keys 1-8 the cursor may be moved around the map. The map may scroll if the cursor is moved to the edge of the screen display.



(A-?) Select ship

Ships are assigned an ID letter (A, B, C, ...). By pressing a key that corresponds to an active ship the computer will shift to the ship display menu and the selected ship will be displayed.

(U) Change terrain

Allows the player to change the type of terrain in the square covered by the cursor (see 15.0).

(Z) Get ship

Allows the player to select a friendly ship in the square covered by the cursor. The computer will shift to the ship display menu.

(X) Exit

Allows the player to exit the deployment phase.

5.2 Ship Display Menu

Ship status data will be displayed at the top of the ship display menu. An example of the ship status data is shown here:

```
E BB YAMATO C:180 S:15 D:2L
E ship ID
BB ship type
YAMATO ship name
C:180 ship course
S:15 ship speed
D:2L ship division; the 'L' means
the Yamato is the lead ship
```

Below the ship data the following menu items are listed:

(M)ove

By pressing the (M) key the current ship will be moved to the cursor location.

(L)ook

By pressing the (L) key the cursor will move to the current ship's location.



(C)ourse

By pressing the (C) key the player may then enter the desired starting course for the current ship (0-358). The computer will only store even numbered values for ship course.

(S)peed

By pressing the (S) key the player may then enter the desired starting speed for the current ship.

(D)ivision

By pressing the (D) key the player may then enter the starting division number (1-9) for the current ship.

(T)ransport

By pressing the (T) key the player may designate the current ship for cargo transport. A 'T' will be displayed next to the division number for cargo carrying ships. By pressing the (T) key again the 'transport status' will be removed.

(R)ename

By pressing the (R) key the player may then change the name of the current ship. The new name may be no longer than 14 letters in length. Ships start the game with their class name.

(W)eapon

By pressing the (W) key the player may then enter the ship's data file and change some or all of the ships characteristics (see 16.0).

(N)ext

By pressing the (N) key the computer will search for the next friendly ship which will become the new current ship.

(X) Exit

The computer will exit the ship display menu and return to the map menu.

6.0 ORDERS PHASE

Players may stop the action phase and enter the orders phase by pressing the (O) key. The computer will shift to the orders phase at the end of the current 2 minute action segment.

6.1 Command Modes

There are two different ways to control ships in the game. In division mode the players give general orders to groups of ships. In ship mode the players give specific orders to individual ships. The players may toggle back and forth between the different command modes during the orders phase. The command mode last chosen during the orders phase will be active during the action phase.

6.2 Map Menu

At the start of the orders phase the map menu will be displayed in the text window at the bottom of the map display.

(1-8) Move cursor

(A-?) Select ship

This option is only available when in ship mode. The computer will shift to the ship menu for the selected ship.

(V) Division

By pressing the (V) key the player may then enter a number (1-9) of an active division. The computer will shift to the division menu for the selected division.

(W) Command mode

By pressing the (W) key the player may change to a different command mode.

(X) Exit

By pressing the (X) key the player may exit the orders phase.

(Z) Get ship

By pressing the (Z) key the player may select the friendly ship at the cursor location. The computer will shift to the ship menu for the selected ship. This option is only available in ship mode.

(O) Score

By pressing the (O) key the player may view the points scored thus far for exiting, damaging, and sinking ships.

6.3 Division Menu

The player may check the current division orders by examining the data listed at the bottom of the text window. An example of the divisional orders data is shown below:

HOLD FIRE	C:134	S:25	F:L
HOLD FIRE	All ships in the division have orders to hold their fire.		
C:134	The division has been assigned a course of 134 (southeast).		
S:25	The division's ships have been assigned a speed of 25 knots.		
F:L	The division's ships have been ordered to assume line formation.		

The following menu options may be used to modify the current divisions orders or examine its ships:

(H)old fire

Instructs the division to hold its fire. Ships will not fire guns or torpedoes when this order is in effect.

(T)orpedo fire

Instructs the division to fire torpedoes only. Ships will not fire guns when this order is in effect. The division's ships will fire torpedoes when the computer judges it wise to do so.

(G)un fire

Instructs the division to fire guns only. Ships will not fire torpedoes when this order is in effect.

(O)pen fire

Instructs the division to fire both guns and torpedoes.

(S)peed

By pressing the (S) key the player may change the assigned division speed.

(C)ourse

By pressing the (C) key the player may alter the assigned division course or heading.

(F)ormation

By pressing the (F) key the players may alter the division's current formation. The division may be in either line or parallel formation (see 7.4).

(E)xamine ships

By pressing the (E) key the player may examine each ship in the division. The computer will shift to the ship menu starting with the division's lead ship.

(X) Exit

By pressing the (X) key the player may return to the map menu.

6.4 Ship Menu

Ship status data will be listed at the top of the text window. An example of the data is shown below:

A	CA	MYOKO	C:120	S:20/34	D:1L
A	the ship has ID letter 'A'				
CA	the ship type is 'CA'				
MYOKO	the ship name is MYOKO				
C:120	the ship's course is 120 or ESE				
S:20/34	the ship's current speed is 20 knots, maximum speed is 34 knots.				
D:1L	the ship is in division 1 and is the lead ship.				

The ship menu contains the following routines:

(W)eapons

By pressing the (W) key the player may view all of the ship's weapons. A sample weapons display is shown below:

CA	MYOKO
2 X 8/50 GUN	F:BOW A:120
2 X 8/50 GUN	F:BOW A:120
2 X 8/50 GUN	F:CENTER A:120
2 X 8/50 GUN	F:STERN A:120
2 X 8/50 GUN	F:STERN A:120
4 X 5/40 GUN	F:LEFT A:250
4 X 5/40 GUN	F:RIGHT A:250
8 X TYPE 93 TORPEDO	F:LEFT A:16
8 X TYPE 93 TORPEDO	F:RIGHT A:16
ARMOR:	B4 D2 T4/0
RADAR:	0 PROPULSION: 34

In the above example the MYOKO has a main armament of 10 eight inch, 50 caliber guns (in 5 double turrets) with 120 rounds of ammo per gun. The secondary armament consists of 8 five inch, 40 caliber guns with 250 rounds of ammo per gun. The torpedo armament consists of 16 Type 93 torpedo tubes with 1 reload per tube.

Also listed on the weapons display, the ship's armor protection consists of: B4 D2 T4/0 meaning 4 inches of belt armor, 2 inches of deck armor, 4 inches of primary turret armor, and 0 inches of secondary turret armor. The ship has no radar and engine propulsion is capable of 34 knots.

(D)amage

By pressing the (D) key the player may view the ship's damage. Flooding damage, electrical damage, and bridge damage will be expressed as a percentage. Rudder damage



will be expressed as a percentage, unless the rudder is jammed or detached. Fires will be expressed numerically, with the larger the number, the greater the fire. When a ship's fire control is knocked out, the damage display will display KO. Any number displayed next to fire control is the radar level of the ship.

(K) Smoke

By pressing the (K) key the player may cause the current ship to 'make smoke'. An 'S' will be displayed on the ship display next to the ship's division number. If the ship is already making smoke then pressing (K) will turn off the smoke. Only DD's, DE's, and Japanese CL's may make smoke.

(G) Target

By pressing the (G) key the player may view the ship's current target. The computer will display the type of target being engaged, the target size, the range to the target, and whether or not the target is 'ranged in' (and if so, by what method of fire control).

(C)hange division

This command may only be used while in division mode. The player may assign the current ship to any division (1-9).

(S)peed

This command may only be used while in ship mode. The player may assign a new speed to the current ship.

(C)ourse

This command may only be used while in ship mode. The player may assign the current ship a new course or instruct it to 'follow' another friendly ship.

(T)orpedo

This command may only be used while in ship mode. The player must determine if a slow or fast torpedo speed setting is used, aim the torpedo mount at a particular point on the map and then fire a salvo consisting of some or all of the mount's torpedoes.

(V)isual

This command may only be used while in ship mode. This routine may be used to select an enemy ship as a target using visual fire control.

(R)adar

This command may only be used while in ship mode. This routine may be used to select an enemy ship as a target using radar fire control.

(L)ook

When the (L) key is pressed the cursor will move to the current ship's location.

(N)ext

When the (N) key is pressed the computer will display the 'next' friendly ship.

(X) Exit

When the (X) key is pressed the computer will return to the division menu if in division mode or the map menu if in ship mode.

7.0 MOVEMENT

7.1 Movement Rate

Each square on the map is 1000 yards across. The game is scaled such that a ship travelling at 30 knots will enter a new square every minute. Ships moving diagonally will take longer (based on the angle) to move one square.

7.2 Changing Speed

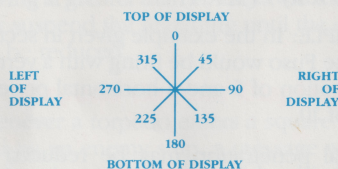
When ships are assigned a new speed, their current speed will be gradually increased or decreased until it equals the assigned speed. The rates of acceleration and deceleration are shown below:

	ACCELERATION	DECELERATION
BB, BC	1 kpm	40% per min
CA, CL, CLAA	2 kpm	55% per min
DD, DE	4 kpm	55% per min

Ships in division mode will always change speed at the BB rate.

7.3 Course and Turning

Ships may travel on any courses with even numbers between 0 and 358. The following diagram shows the relationship between the course number and your display:



When ships are assigned a new course, their current course will be gradually changed until it equals the assigned course. The rates that ships change course are shown below:

1. DD, DE 48 per min
2. BB, BC, CA, CL, CLAA 32 per min
3. DIVISION MODE 32† per min
4. RUDDER DAMAGE > 25%
or
BRIDGE DAMAGE > 49% 20 per min
5. RUDDER DETACHED 12 per min

Undamaged ships in ship mode will use the turn rates shown on lines 1 or 2. Undamaged ships in division mode will use the rate shown on line 3. Ships with a damaged bridge or rudder will use the rates shown on lines 4 or 5.

7.4 Moving in Formation

In division mode only, ships will move in formation. Divisions may be assigned either line or parallel formation.

In line formation, the lead ship will assume the division's assigned course, the second ship will follow the lead ship, the third ship will follow the second, etc. A ship that is more than one square away from the ship which it is following will speed up (if possible) and attempt to catch up to the leading ship. Ships within one square of the ship they are following will set their speed to match that of the ship they are following.

Ships in division mode will always have their course rounded to the nearest 45° in-

crement for movement purposes, although the ship display will show the unrounded number. Example: A ship in division mode with an ordered course of 200° will actually move in course 180°. This will enable ships to maintain line formations.

In parallel formation, all ships in the division will assume the division's assigned course.

7.5 Running Aground

A ship that moves into a land square will immediately have its propulsion reduced to 0. There are no other effects from running aground.

7.6 Collisions

Ships in the same square may collide with one another if at least one ship is going at least 10 knots. Ships travelling on the same course will have a greatly reduced chance of collision. Ships will usually not collide with the ship they are following. If a collision occurs, both ships will be reduced in speed to less than 10 knots and will suffer damage based on the size of the ships and their speed at the moment of collision.

8.0 GUNFIRE

8.1 Selecting Targets for Gunfire

When using division mode, ships will automatically select targets for gunfire if their division has been assigned gun fire or open fire instructions.

When using ship mode, the players may select targets for individual ships by using the visual or radar commands on the ship menu. Ships with a radar rating of zero and ships with their fire control destroyed may not use radar target selection. Ships using the visual routine to select their targets will employ visual fire control and use the visual gunfire accuracy modifiers. Ships using the radar routine to select targets will employ radar fire control and use the radar gunfire accuracy modifiers.

8.2 Gunfire Accuracy

The probability of a gunshot hitting its target is equal to $1/a$ where a represents the 'inverse gunfire accuracy' of a particular gunfire. The list of accuracy modifiers used to calculate a are shown below:

FC	EFFECT	DESCRIPTION
all	add	target speed / 2
all	add	target turn* / 2
all	add	firer speed / 2
all	add	firer turn* / 2
V	add	10, if other ships firing at target
V	add	30, if ranging in
V	add	20, if visibility < 21; add 5 if firing ship is Japanese
	or	
V	add	30, if visibility < 7, add 15 if firing ship is Japanese
R	add	30, for radar fire control

* The difference between the ship's current course and its assigned course. Ships following other ships consider their assigned courses to be that which aims them directly at the ship they are following.



AFTER ALL ADDITIONS HAVE BEEN MADE, THE FOLLOWING MULTIPLIERS MAY BE APPLIED:

- all $\times \frac{1}{2}$, if crossing the target ship's 'T'
 all $\times (10 - \text{RADAR}) / 10$, $\times 2$ if fire control is KO'd
 all $\times \text{RANGE} / \text{GUN MAX RANGE}$
 V $\times \frac{1}{2}$, if ranged in

AFTER ALL MULTIPLIERS HAVE BEEN APPLIED:

- all add 5
 all add 5, if CA, CL, CLAA, AK target
 all add 25, if DD, DE target

V = visual fire control only

R = radar fire control only

EXAMPLE: The Fuso without radar is visually ranging in on the New Mexico at a range of 30,000 yards. Both ships are travelling at their maximum speeds, and neither ship is turning. The New Mexico is not being fired upon by any other ship. The visibility is 30. The chance to hit is 1/46:

$$a = ((24/2 + 22/2 + 30) * 30/38) + 5 = 46$$

If the Fuso is successful in ranging in, it will have a 1/14 chance on its next attempt:

$$a = ((24/2 + 22/2) * 30/38 * \frac{1}{2}) + 5 = 14$$

Note that round off errors of ± 1 may occur.

The probability of a gunshot hitting will never be worse than 1/230.

8.3 Ranging In

Ships using visual fire control must spend at least 1 turn of 'ranging in' fire before firing for full effect. Ships succeed in ranging in if accuracy (a) $\times$ RND < 50 . During a ranging fire turn, ships will only fire 1 shot per gun. Ships using radar fire control are never required to range in.

8.4 Ammo Use

The number of shells fired per gun is equal to $1 + \text{ammo} / 50$. The ammo number shown on the weapons display represents the number of rounds remaining for each gun. Ships ranging in on a target will fire only 1 shot per gun.

8.5 Gun Hit Location and Armor Penetration

When a ship is hit by gunfire the computer will randomly determine the section of the ship that was hit and calculate the chance of the shell penetrating the armor. Possible hit locations are listed below:

1. NEAR MISS
2. BELT HIT
3. DECK HIT
4. SUPERSTRUCTURE HIT (side or top)
5. PRIMARY TURRET HIT (side or top)
6. SECONDARY TURRET HIT (side or top)
7. TERTIARY TURRET HIT
8. TORPEDO MOUNT HIT

Shell hits that penetrate a ship's armor can cause significant damage to the ship. To determine if a shell penetrates, the gun's adjusted penetration rating (APR) must be compared to the armor protecting the hit location. If the APR is greater than the ship's

armor, the hit automatically penetrates. If the APR is equal to the ship's armor, the hit has a 50% chance of penetrating. A ship's armor is listed on the weapons display section of the ship menu. Superstructure side armor is the same as belt armor. Superstructure top armor is the same as deck armor. Turret top armor is equal to $\frac{1}{3}$ of the turret side armor listed on the display. Tertiary turrets and torpedo mounts are unarmored. Possible damage caused by a near miss is determined by comparing the shell size (not penetration) to the belt armor.

Two APRs are calculated for each gunfire, horizontal and vertical penetration. Vertical penetration is used against deck, superstructure top and turret top armor. Horizontal penetration is used against all other armor.

P = GUN PENETRATION RATING

R = RANGE TO TARGET

M = GUN MAXIMUM RANGE

$$\text{vertical penetration} = 1 + (P \times R) / (M \times 4)$$

horizontal penetration

$$= 1 + ((1 + M - R) \times P) / (M \times 2) + P/2 - (P \times R) / (M \times 4)$$

EXAMPLE: In the example given in section 8.2, the Fuso would be firing with a vertical penetration of 5 and a horizontal penetration of 10.

Vertical penetration may be reduced for certain shell sizes:

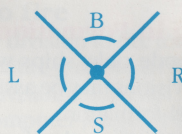
SHELL SIZE	6	$\times \frac{2}{3}$
	3-5.5	$\times \frac{1}{3}$

8.6 Weapon Facing

Weapons (both guns and torpedoes) on a ship may have 5 possible facings:

1. BOW
2. CENTER
3. LEFT
4. RIGHT
5. STERN

Weapons with the wrong facing relative to the target will be unable to fire at that target. A facing diagram is shown below:



The above diagram represents the field of fire of a ship traveling on course 0. The field is divided into four 90 degree arcs labeled B, L, R, S.

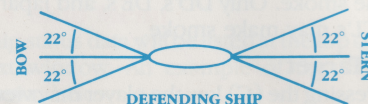
1. Bow faced guns may not fire at targets in the 'S' arc.
2. Center faced guns may not fire at targets in the 'B' or 'S' arcs.
3. Left faced guns may *only* fire at targets in the 'L' arc.
4. Right faced guns may *only* fire at targets in the 'R' arc.
5. Stern faced guns may not fire at targets in the 'B' arc.

8.7 Secondary Targets

In many situations a ship has certain gun mounts that are unable to 'face' the ship's primary target. In these situations the gun mount will fire at the nearest visible enemy ship that it can face. Secondary and tertiary gun mounts, such as the 5 inch turrets on battleships and cruisers, will always fire at the nearest visible enemy ship that can be faced.

8.8 Crossing the T

A ship's T is crossed if it is being fired at by an enemy ship from within either of the areas shown below:



8.9 Gun Data

Twenty-four different gun types are included in the game. Gun ratings are listed below:

ID	DESCRIPTION	SIZE	RANGE	PEN
6	18.1/45	35	46	26
7	16/50	30	42	26
8	16/45	27	40	25
9	15/42	22	32	23
10	14/50	18	36	23
11	14/45	18	38	23
12	12/50	14	33	17
13	8/55	6	31	9
14	8/50	6	30	8
15	6/60	4	30	7
16	6/53	4	26	7
17	6/50	4	20	7
18	6/47	4	26	7
19	6/45	4	18	7
20	5.5/50	4	19	5
21	5/51	3	13	5
22	5.25/50	4	22	5
23	5/50	3	20	4
24	5/40	3	16	4
25	5/38	3	17	4
26	5/25	3	14	4
27	4.7/45	3	16	4
28	4.7/50	3	18	4
29	4.5/45	3	17	4
30	4/50	2	14	4
31	4/45	2	16	3
32	3.9/65	2	20	4
33	3.9/60	2	18	4
34	3/60	1	15	3

The gun description consists of two numbers: gun barrel size in inches / gun caliber. Numbers listed in the SIZE column represent the weight of the shell. Numbers listed in the RANGE column reflect the range of the gun in 1000s of yards. Numbers listed in the PEN column reflect the armor penetration effectiveness of the gun.

8.10 Combat Gunfire Display

When one ship fires its guns at another ship during the action phase, a message such as the one below will be displayed:

BB UNDER FIRE FROM 16/50 GUNS
 ACCURACY: 1/38 PEN 22 3
 BELT HIT*
 PRIMARY TURRET HIT



In the previous example, a battleship is being fired at by a turret of 16/50 guns, with each shell fired having a 1 in 38 chance of hitting. The shells have a horizontal penetration capability of 22 and a vertical penetration capability of 3. The firing ship has scored two hits, the first penetrating the belt armor (an * indicates penetration; a second * indicates flotation damage), the second bouncing off the armor of a primary turret. There will be no delay after the display of a non-penetrating hit.

9.0 TORPEDOES

9.1 Torpedo Salvoes

Torpedoes are fired in salvoes of 1 or more torpedoes. All torpedoes in a salvo move together. When a salvo enters a square occupied by a ship, each torpedo will have a chance of hitting the ship.

9.2 Torpedo Intercept Angle

The torpedo intercept angle (IA) is important in determining the chance of torpedoes hitting the ship. The IA is calculated by comparing the torpedoes' course to that of the ship they are attacking.

$$IA = \text{ABS}(\text{TORP COURSE} - \text{SHIP COURSE})$$

If $IA > 180$ then $IA = IA - 180$

If $IA > 90$ then $IA = 180 - IA$

EXAMPLE: TORPEDO COURSE = 300
SHIP COURSE = 20
 $\text{ABS}(300 - 20) = 280$
 $280 > 180$ so: $280 - 180 = 100$
 $100 > 90$ so: $180 - 100 = 80$
 $IA = 80$

9.3 Torpedo Hit Probability

Each torpedo in a salvo will have a chance of hitting a ship in the same square. The chance of a torpedo hit is calculated using the IA, ship evasion capability and torpedo speed:

$$\text{Ship Evasion (EV)} = 225 \text{ for DD, DE} \\ 135 \text{ for all others}$$

$$\text{If ship speed} < 10 \text{ then } EV = EV \times \text{SPEED} / 10$$

$$\text{HIT\%} = \text{TORP SPEED} \times (IA + 5) / EV$$

The HIT% formula above shows that the larger the IA, the better the chance of a torpedo hit. For any ship traveling at a speed greater than 4 knots there will be a 50% chance that the ship will make an evasive turn to reduce the IA. After the evasive turn the IA will be reduced by a number equal to ½ the ship's turn rate (see 7.3).

9.4 Dud Torpedoes

Torpedoes that hit a ship and explode will cause significant damage to the ship. Ten percent of all torpedoes will be duds that do not explode (the MK-15 torpedo will have a 50% dud rate during 1941-42). Dud torpedoes will cause no damage.

9.5 Torpedo Symbols

For solitaire games, only the human-fired torpedoes will be visible but the computer-fired torpedoes will not.

9.6 Torpedo Data

There are 5 different types of torpedoes included in the game. Torpedo ratings are listed below:

ID	DESCRIPTION	SIZE	SPEED	RANGE
1	MK-IX	9	35/40	14/10
2	MK-15	8	25/40	14/6
3	MK-VII	9	33/38	16/11
4	TYPE 6	10	25/35	16/8
5	TYPE 93	20	35/50	45/22

The numbers listed in the size column represent the size of the torpedo warhead. There are two numbers listed for both the speed and range of the torpedo. The first number is the speed or range of the torpedo at the 'slow setting' and the second number is the speed or range of the torpedo at the 'fast setting'.

9.7 Torpedo Reloads

Most Japanese ships carry reloads for their torpedo mounts. After these ships fire their torpedoes the reload procedure will begin automatically. Reloading torpedo mounts will normally take 30 minutes; however, it may be delayed in certain situations. Ships moving at greater than 21 knots will temporarily suspend the reloading until the speed can be reduced.

9.8 Torpedo Combat Displays

Whenever a torpedo enters a square occupied by an enemy ship, a message will be displayed stating the class of the ship being attacked, the course of the torpedoes, and any hits scored by the torpedoes. The display will also state any dud torpedo hits.

10.0 SEARCHING

Every two minutes of game time, ships will perform both radar and visual searches to locate and target enemy ships.

10.1 Search Procedure

The search segment occurs at the end of each two minutes of the action phase. At the start of the search segment all ships will become 'unsighted'. During the search segment each ship may search and sight any enemy ship within detection range.

10.2 Visual Search

To determine if an enemy ship (target) is within visual detection range, the following formula is used:

V = VISIBILITY

R = RANGE TO TARGET

SS = SEARCHER SIZE (FLOTATION)

TS = TARGET SIZE (FLOTATION)

TF = TARGET FIRE LEVEL

DR = DETECTION RANGE

NIGHT DETECTION ($V < 21$):

$$DR = V^* + TF$$

+5 if target is firing

+5 if target is under fire

* To calculate visibility when $V < 21$, multiply V by 0.75 for Allied ships conducting visual search.

DAY DETECTION ($V > 20$):

$$DR = 10 + V/2 + SS/20 + TS/20 + TF$$

+5 if target is under fire

If $DR \geq R$ then the target is sighted.

10.3 Radar Search

Only ships with a radar rating greater than zero may perform a radar search. The formula for radar detection is shown below:

RR = RADAR RATING

RADAR DETECTION

$$DR = 10 + RR \times 10$$

if $DR \geq R$ then DETECTION except

if $R > DR/2$ and $TS < R$ then

NO DETECTION

10.4 Smoke

A ship cannot see *through* a square in which another ship is making smoke. However, ships can see *into* and can see *out of* a square containing a ship making smoke. And ships may always use radar to see and fire through smoke.

10.5 Land

Ships may not see through full land (terrain type N; see section 15.2) squares (visually or with radar), but they may see through partial land squares (terrain types B-M).

11.0 DAMAGE

Ships may be damaged when hit by torpedoes or gunfire. Ships may receive additional damage from uncontrolled fires and flooding. All damage is cumulative.

11.1 Torpedo Damage

When a torpedo explodes against a ship, the following types of damage may be expected:

FLOOD% =

$$(1 + \text{WARHEAD} \times \text{RND}) / \text{FLOTATION} \\ \text{FIRE} + 4 \times \text{RND}$$

In addition, the following types of damage are probable:

50% chance PROPULSION - 5 knots

30% chance PROPULSION - 10 knots

20% chance RUDDER DAMAGE =
 $25 + 75 \times \text{RND}$

20% chance above damage DOUBLED

4% chance above damage TRIPLED

11.2 Gunfire Damage

The types of damage caused by gunfire will vary with the location and armor penetration. Shots that fail to penetrate the armor will have a chance of adding 1 to the fire level; this chance is equal to the shell size divided by 40 (i.e., an 8/55 shell will have a 6/40 or 15% chance of adding one to the fire level), but will cause no other damage.

S = SHELL SIZE

R = RANDOM NUMBER between 0 and 1

F = TARGET FLOTATION

Near Miss

If $S \times R < \text{BELT ARMOR}$ then no effect otherwise $\text{FLOOD\%} = 3 \times R / F$



Belt Hit

- 60% FLOOD% = $1 + R \times S / 2 \times F$
 5% FLOOD% = $1 + R \times S / F$
 and PROPULSION - 5 knots
 15% PROPULSION - 5 knots
 5% RUDDER DAMAGE = $25 + S \times R$
 13% FIRE + 1
 2% MAGAZINE EXPLODES

Deck Hit

- 15% FLOOD% = $1 + R \times S / 2 \times F$
 10% FLOOD% = $1 + R \times S / F$
 and PROPULSION - 5 knots
 5% RUDDER DAMAGE = $25 + S \times R$
 20% PROPULSION - 5 knots
 46% FIRE + 1
 4% MAGAZINE EXPLODES

Superstructure Hit

- 15% BRIDGE DAMAGE = $25 + 5 \times S \times R$
 15% FC/RADAR KO'D
 5% ELECTRIC DAMAGE = $10 \times S \times R$
 65% FIRE + 1

Turret Hit

- 99% TURRET KO'D
 1% MAGAZINE EXPLODES

11.3 Fire Damage

Uncontrolled fires on a ship may cause damage to ship systems. Additional damage may occur on a burning ship every two minutes if $RND \times 20 < \text{fire level}$.

Fire Damage

- 20% WEAPON KO'D
 50% FIRE + 1
 15% PROPULSION - 5 knots
 5% BRIDGE DAMAGE + 10
 5% FC/RADAR KO'D
 4% ELECTRIC DAMAGE + 25
 1% MAGAZINE EXPLODES

11.4 Flood Damage

Ships with uncontrolled flooding may suffer additional damage to ship systems.

If FLOOD% > 25 and $RND \times 10 < 2$
 then additional FLOOD% DAMAGE =
 $1 / \text{FLOTATION} = 2$

If FLOOD% > 50 then additional
 ELECTRIC DAMAGE = $25 \times RND$

11.5 Repairs

At the start of each two minute segment, a ship's damage control parties will have a chance to repair damage. The ability to repair damage will be affected by the damage control rating (DC) assigned when building the scenario.

Repairs

- 5% FLOOD% - $1 / \text{FLOTATION} \times 2$
 15% FIRE - 1
 5% ELECTRIC DAMAGE - 10
 5% BRIDGE DAMAGE - 10
 3% JAMMED RUDDER DETACHED
 3% RUDDER DAMAGE - 25

The chances of repair listed above will be multiplied by the player's DC rating. Thus a player with a DC rating of 3 will have a 45% chance of reducing the fire level on his ships every 2 minutes.

12.0 DAMAGE EFFECTS

A ship's damage will reduce its combat effectiveness and, in the case of severe flooding, cause it to sink.

12.1 Fire Effects

Uncontrolled fires burning on a ship may cause additional damage to ship systems (see 11.3).

12.2 Flooding Effects

Heavy flooding may cause additional damage to ship systems (see 11.4). At the start of each 2 minute segment, a ship with 100% flood damage will have a 10% chance of sinking (the ship will automatically sink if the fire level is greater than two times the ship's flotation rating). Flooding will proportionately reduce a ship's maximum speed. For example a ship with propulsion of 30 knots and 50% flood damage will have a maximum speed of only 15 knots. If the flood damage is repaired then the maximum speed will increase towards the propulsion rating.

12.3 Electric Damage

Damage to a ship's electric system will affect its ability to fire its weapons or use radar. Ships with greater than 49% electric damage will be unable to fire guns or torpedoes, or use radar. Ships with less than 50% damage will randomly use or lose electric power during each two minute segment. For example, a ship with 25% electric damage will have a 50% chance of losing electric power during each 2 minute segment ($\text{damage} \times 2$ equals chance of failure).

12.4 Bridge Damage

Ships with bridge damage greater than 49% will have their ability to maneuver impaired (see 7.3).

12.5 Rudder Damage

Ships with rudder damage between 26% and 49% and ships with their rudder 'detached' (DT) will have their ability to maneuver impaired (see 7.3). Ships with rudder damage greater than 49% will have their rudder 'jammed' in a particular direction, either left (JL), right (JR), or straight ahead (JS). Ships with a jammed rudder must move or turn in the direction the rudder is jammed. During the repair segment a jammed rudder may be either repaired, detached, or jammed in a different direction.

12.6 Fire Control and Radar Damage

When a ship's fire control is KO'd its radar will also be KO'd. Ships with fire control KO'd will have their gunfire accuracy halved. Fire control and radar may not be repaired during the game.

12.7 Propulsion Loss

Propulsion loss represents a reduction in a ship's maximum speed. Propulsion systems may never be repaired during the game.

12.8 Magazine Explosion

Magazine explosions in the game are usually fatal. 100% flooding and 100 fire levels are added by a magazine explosion.

12.9 Weapons Mount KO'd

Weapon mounts (gun or torpedo) KO'd may not be repaired during the game. When a torpedo mount is destroyed, its ammo will be set to 0.

13.0 SCORING

Points may be scored for damaging or sinking enemy ships and sometimes for exiting ships off a particular map edge.

13.1 Points for Ships Sunk

Points scored for sinking enemy ships is equal to the ship selection points (SSPs) required to buy the ship. Points will be doubled for sinking ships designated for cargo transport.

13.2 Points for Ships Damaged

Points scored for damaging enemy ships varies with the level of damage and the SSP value of the ship.

F = FLOTATION

d% = DAMAGE LEVEL

P = PROPULSION

d% = $\text{FIRE} / \text{F} + \text{FLOOD\%}$

If RUDDER JAMMED or DETACHED
 then d% + F / 4

If P < 15

then d% + $(\text{F} / 2) \times (15 - \text{P}) / 15$

If d% > 0.9 then d% = 0.9

POINTS SCORED = d% $\times$ SSP

If damaged ship has air cover

then POINTS $\times 5/9$

If damaged ship is designated for cargo transport then POINTS $\times 2$

13.3 Points Scored for Transport

In Transport scenarios the attacking player scores points for exiting designated transport ships off a particular map edge. The Japanese player must exit his transports off the east map edge to score points. The Allied player must exit his transports off the west edge to score points. The points scored vary with the type of ship exited:

AK 50

BB, CA, CL 10 (Japanese only)

DD 5 (Japanese only)

No points are scored if the transport has a fire level greater than 4.

13.4 Points Scored for Bombardment

In Bombardment scenarios the attacking player scores points for exiting combat ships off a particular map edge. The number of points scored varies with the number and size of the ship's main guns.

BB, BC 8 per main gun

CA 4 per main gun

CL 2 per main gun

CLAA, DD, DE 1 per gun



The Japanese player may only score points for exiting ships off the east map edge. The Allied player may only score points for exiting ships off the west map edge.

13.5 Victory Conditions

The player scoring the most points is considered the victor. In bombardment scenarios, the bombarding player must score at least twice the number of points as the defending player in order to win (if he does not, the defending player is the victor).

14.0 SCENARIOS

14.1 Guadalcanal I (13 November 1942)

This is a Japanese bombardment scenario with a one-hour game length. The Japanese SSP total is 449, while the U.S. SSP total is 268. An American force of eight destroyers and five cruisers engaged a Japanese force of two battleships, one light cruiser and 11 destroyers. The Allies lost two light cruisers and four destroyers while the Japanese lost one battleship and two destroyers.

14.2 Guadalcanal II (14 November 1942)

This is a Japanese bombardment scenario with a two-hour game length. The Japanese SSP total is 428, while the U.S. SSP total is 442. This was one of only two WWII Pacific engagements between opposing battleships. Two American battleships and four destroyers fought one Japanese battleship, two heavy cruisers, two light cruisers, and 11 destroyers. Two American destroyers, one Japanese battleship, and one Japanese destroyer were sunk.

14.3 Empress Augusta Bay (2 November 1943)

This is a Japanese bombardment scenario with a two-hour game length. The Japanese SSP total is 251, while the U.S. SSP total is 288. An American force of four new radar-equipped CL's and eight DD's turned back a Japanese bombardment group consisting of two CA's, two CL's, and six DD's. One Japanese light cruiser and one destroyer were sunk.

14.4 San Bernardino (25 October 1944)

This is a battleline scenario with a two-hour game length. The Japanese SSP total is 1150, while the U.S. SSP total is 1514. This is a hypothetical engagement between battlelines during the Leyte invasion.

15.0 DESIGNING CUSTOM MAPS

If the (D)ESIGN MAP option is selected (see 4.2) then the map build routine may be used to create a custom map.

15.1 Map Build Menu

The following menu options may be used to examine the map and change terrain:

(1-8) Move cursor

(A-N) Set terrain

Each letter, A through N, represents a different terrain symbol. When a letter key (A-N) is pressed then the terrain will be altered in the square where the cursor is located.

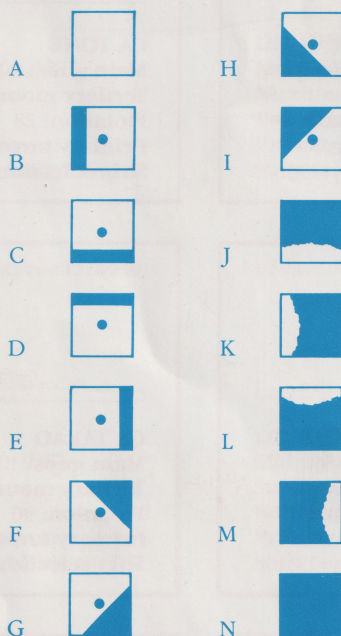
(U) Auto shift

When auto shift is activated then the cursor location will shift 1 square in the selected direction (1-8) after each set terrain key has been pressed. This function is useful in reducing the number of key strokes required to create a new map.

(X) Exit

When the (X) key is pressed, the computer will exit the map build routine and enter the save routine. The map save option should be used to save your custom map to a scratch disk.

15.2 Terrain Types



16.0 MODIFYING SHIP DATA

Players may create custom ships by modifying some or all of the ship data.

16.1 Modifying Weapons Data

Ships have a maximum of 10 weapon mounts. Main guns are always listed first, secondary weapons second and tertiary weapons third. Unused mounts are always the highest numbered mounts. Secondary and tertiary turrets that have the same facing may be grouped together on one 'mount'. The number of guns/tubes per turret must be designated to determine how many guns/tubes are destroyed when a turret is KO'd. The number of guns/tubes must be evenly divided by the guns/tubes per turret or the guns/tubes per turret will automatically be set to 1.

When changing weapon mounts, the following data elements may be altered:

1. WEAPON TYPE

Use ID numbers listed in 8.8 and 9.6 (0 = no weapon).

2. NUMBER GUNS/TUBES

3. FACING (1-5)

See 8.6.

4. AMMO/TORPEDOES

5. MAIN, SECONDARY OR TERTIARY MOUNT

6. GUNS/TUBES PER TURRET

Does not apply to MAIN gun turrets.

16.2 Modifying Non-Weapons Data

The following non-weapons data elements may be altered:

1. MAXIMUM SPEED

2. FLOTATION

Equals $1 + \text{Ship Displacement} / 500$ (tons).

3. RADAR (0-4)

4. BELT ARMOR (inches)

5. DECK ARMOR

6. MAIN TURRET ARMOR

7. SECONDARY TURRET ARMOR

Note: Tertiary mounts are always unarmored.

8. SHIP SELECTION POINTS

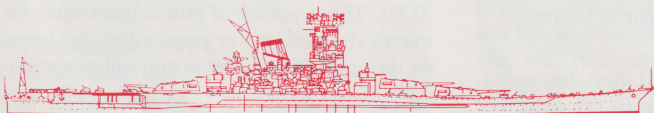
(used for scoring)



17.0 SHIP DATA

The following eight pages display detailed ship data for each of the 79 vessels included in WARSHIP (Japanese and Allied). Refer to pages 17 and 18 for drawings that are in relative scale; refer to pages 19 and 20 for a complete chart that summarizes all of the information in this section.

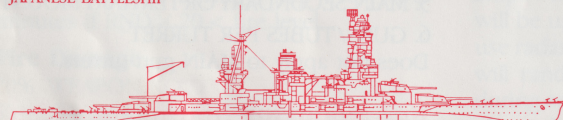
JAPANESE BATTLESHIP



BB YAMATO

Main guns: 9 x 18.1"/45 Secondary mounts: 12 x 6"/60
Tertiary mounts: 12 x 5"/40 Maximum speed: 27
Flotation: 125 Radar: 0 Belt armor: 16 Deck armor: 9
Primary turret armor: 24 Secondary turret armor: 2
Ship selection points: 250 Earliest yr. of availability: 1942

JAPANESE BATTLESHIP



BB NAGATO

Main guns: 8 x 16"/45 Secondary mounts: 16 x 5.5"/50
Tertiary mounts: 8 x 5"/40 Maximum speed: 27
Flotation: 80 Radar: 0 Belt armor: 12 Deck armor: 4
Primary turret armor: 14 Secondary turret armor: 5
Ship selection points: 175 Earliest yr. of availability: 1941

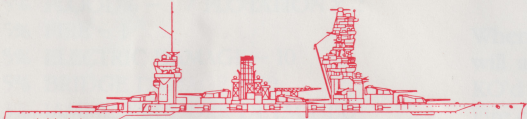
JAPANESE BATTLESHIP



BB KONGO

Main guns: 8 x 14"/45 Secondary mounts: 16 x 6"/50
Tertiary mounts: 8 x 5"/40 Maximum speed: 30
Flotation: 70 Radar: 0 Belt armor: 8 Deck armor: 4
Primary turret armor: 9 Secondary turret armor: 3
Ship selection points: 133 Earliest yr. of availability: 1941

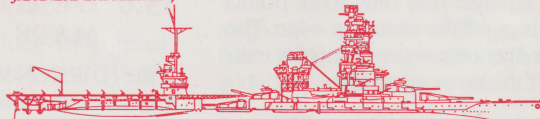
JAPANESE BATTLESHIP



BB FUSO

Main guns: 12 x 14"/45 Secondary mounts: 14 x 6"/50
Tertiary mounts: 8 x 5"/40 Maximum speed: 24
Flotation: 70 Radar: 0 Belt armor: 12 Deck armor: 4
Primary turret armor: 12 Secondary turret armor: 4
Ship selection points: 161 Earliest yr. of availability: 1941

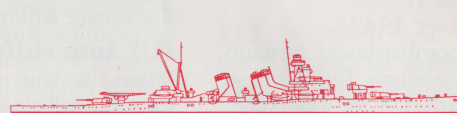
JAPANESE BATTLESHIP



BB ISE

Main guns: 8 x 14"/45 Secondary mounts: 16 x 5"/50
Maximum speed: 24 Flotation: 70 Radar: 0
Belt armor: 12 Deck armor: 4
Primary turret armor: 12 Secondary turret armor: 1
Ship selection points: 136 Earliest yr. of availability: 1944

JAPANESE HEAVY CRUISER



CA AOBA

Main guns: 6 x 8"/50 Secondary mounts: 4 x 4.7"/45
Tertiary mounts: 8 x 93TT Maximum speed: 33
Flotation: 20 Radar: 0 Belt armor: 3 Deck armor: 2
Primary turret armor: 4 Secondary turret armor: 0
Ship selection points: 38 Earliest yr. of availability: 1941

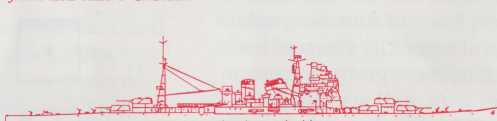
JAPANESE HEAVY CRUISER



CA TONE

Main guns: 8 x 8"/50 Secondary mounts: 8 x 5"/40
Tertiary mounts: 12 x 93TT Maximum speed: 35
Flotation: 28 Radar: 0 Belt armor: 4 Deck armor: 2
Primary turret armor: 4 Secondary turret armor: 0
Ship selection points: 52 Earliest yr. of availability: 1941

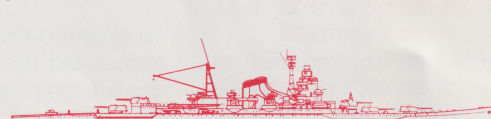
JAPANESE HEAVY CRUISER



CA TAKAO

Main guns: 10 x 8"/50 Secondary mounts: 8 x 5"/40
Tertiary mounts: 16 x 93TT Maximum speed: 34
Flotation: 30 Radar: 0 Belt armor: 4 Deck armor: 2
Primary turret armor: 4 Secondary turret armor: 0
Ship selection points: 58 Earliest yr. of availability: 1941

JAPANESE HEAVY CRUISER



CA MOGAMI

Main guns: 10 x 8"/50 Secondary mounts: 8 x 5"/40
Tertiary mounts: 12 x 93TT Maximum speed: 35
Flotation: 28 Radar: 0 Belt armor: 4 Deck armor: 2
Primary turret armor: 4 Secondary turret armor: 0
Ship selection points: 55 Earliest yr. of availability: 1941

JAPANESE LIGHT CRUISER



CL TENRYU

Main guns: 4 x 5.5"/50 **Secondary mounts:** 6 x 6TT
Maximum speed: 33 **Flotation:** 9 **Radar:** 0
Belt armor: 2 **Deck armor:** 1
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 16 **Earliest yr. of availability:** 1941

JAPANESE LIGHT CRUISER



CL AGANO

Main guns: 6 x 6"/60 **Secondary mounts:** 4 x 3"/60
Tertiary mounts: 8 x 93TT **Maximum speed:** 35
Flotation: 125 **Radar:** 1 **Belt armor:** 2 **Deck armor:** 1
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 26 **Earliest yr. of availability:** 1943

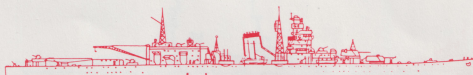
JAPANESE LIGHT CRUISER



CL KUMA

Main guns: 7 x 5.5"/50 **Secondary mounts:** 8 x 93TT
Maximum speed: 33 **Flotation:** 11 **Radar:** 0
Belt armor: 2 **Deck armor:** 1
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 23 **Earliest yr. of availability:** 1941

JAPANESE LIGHT CRUISER



CL OYODO

Main guns: 6 x 6"/60 **Secondary mounts:** 8 x 3.9"/60
Maximum speed: 36 **Flotation:** 22 **Radar:** 1
Belt armor: 2 **Deck armor:** 1
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 31 **Earliest yr. of availability:** 1944

JAPANESE LIGHT CRUISER



CL KITAKAMI

Main guns: 4 x 5.5"/50 **Secondary mounts:** 40 x 93TT
Maximum speed: 33 **Flotation:** 11 **Radar:** 0
Belt armor: 2 **Deck armor:** 1
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 44 **Earliest yr. of availability:** 1941

JAPANESE DESTROYER



DD MINEKAZE

Main guns: 2 x 4.7"/50 **Secondary mounts:** 2 x 6TT
Maximum speed: 36 **Flotation:** 3 **Radar:** 0
Belt armor: 0 **Deck armor:** 0
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 5 **Earliest yr. of availability:** 1941

JAPANESE LIGHT CRUISER



CL NAGARA

Main guns: 7 x 5.5"/50 **Secondary mounts:** 8 x 93TT
Maximum speed: 36 **Flotation:** 11 **Radar:** 0
Belt armor: 2 **Deck armor:** 1
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 23 **Earliest yr. of availability:** 1941

JAPANESE DESTROYER



DD KAMIKAZE

Main guns: 3 x 4.7"/50 **Secondary mounts:** 6 x 6TT
Maximum speed: 36 **Flotation:** 3 **Radar:** 0
Belt armor: 0 **Deck armor:** 0
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 7 **Earliest yr. of availability:** 1941

JAPANESE LIGHT CRUISER



CL YUBARI

Main guns: 6 x 5.5"/50 **Secondary mounts:** 4 x 93TT
Maximum speed: 35 **Flotation:** 8 **Radar:** 0
Belt armor: 2 **Deck armor:** 1
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 16 **Earliest yr. of availability:** 1941

JAPANESE DESTROYER



DD MUTSUKI

Main guns: 2 x 4.7"/50 **Secondary mounts:** 6 x 93TT
Maximum speed: 33 **Flotation:** 4 **Radar:** 0
Belt armor: 0 **Deck armor:** 0
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 9 **Earliest yr. of availability:** 1941

JAPANESE DESTROYER



DD FUBUKI

Main guns: 6 x 5"/50 Secondary mounts: 9 x 93TT
Maximum speed: 38 Flotation: 5 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 15 Earliest yr. of availability: 1941

JAPANESE DESTROYER



DD AKIZUKI

Main guns: 8 x 3.9"/65 Secondary mounts: 4 x 93TT
Maximum speed: 33 Flotation: 7 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 14 Earliest yr. of availability: 1942

JAPANESE DESTROYER



DD HATSUHARU

Main guns: 5 x 5"/50 Secondary mounts: 6 x 93TT
Maximum speed: 33 Flotation: 4 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 11 Earliest yr. of availability: 1941

JAPANESE DESTROYER ESCORT



DE MUTSU

Main guns: 3 x 5"/50 Secondary mounts: 4 x 93TT
Maximum speed: 27 Flotation: 4 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 8 Earliest yr. of availability: 1944

JAPANESE DESTROYER



DD SHIRATSUYU

Main guns: 5 x 5"/50 Secondary mounts: 8 x 93TT
Maximum speed: 34 Flotation: 5 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 14 Earliest yr. of availability: 1941

AMERICAN BATTLESHIP



BB NEVADA

Main guns: 10 x 14"/45 Secondary mounts: 12 x 5"/51
Tertiary mounts: 8 x 5"/25 Maximum speed: 21
Flotation: 60 Radar: 0 Belt armor: 13 Deck armor: 4
Primary turret armor: 16 Secondary turret armor: 1
Ship selection points: 146 Earliest yr. of availability: 1941

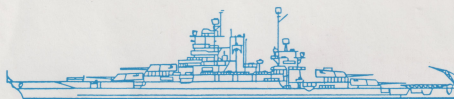
JAPANESE DESTROYER



DD KAGERO

Main guns: 6 x 5"/50 Secondary mounts: 8 x 93TT
Maximum speed: 35 Flotation: 6 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 15 Earliest yr. of availability: 1941

AMERICAN BATTLESHIP



BB NEW MEXICO

Main guns: 12 x 14"/50 Secondary mounts: 8 x 5"/38
Maximum speed: 22 Flotation: 65 Radar: 0
Belt armor: 14 Deck armor: 6
Primary turret armor: 16 Secondary turret armor: 1
Ship selection points: 161 Earliest yr. of availability: 1941

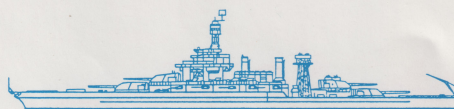
JAPANESE DESTROYER



DD SHIMAKAZE

Main guns: 6 x 5"/50 Secondary mounts: 15 x 93TT
Maximum speed: 39 Flotation: 7 Radar: 1
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 21 Earliest yr. of availability: 1943

AMERICAN BATTLESHIP



BB MARYLAND

Main guns: 8 x 16"/45 Secondary mounts: 16 x 5"/38
Maximum speed: 21 Flotation: 70 Radar: 0
Belt armor: 16 Deck armor: 5
Primary turret armor: 16 Secondary turret armor: 1
Ship selection points: 172 Earliest yr. of availability: 1941

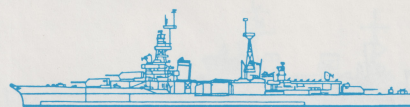
AMERICAN BATTLESHIP



BB NORTH CAROLINA

Main guns: 9 x 16"/45 Secondary mounts: 20 x 5"/38
Maximum speed: 28 Flotation: 75 Radar: 2
Belt armor: 16 Deck armor: 5
Primary turret armor: 16 Secondary turret armor: 1
Ship selection points: 201 Earliest yr. of availability: 1942

AMERICAN HEAVY CRUISER



CA NORTHAMPTON

Main guns: 9 x 8"/55 Secondary mounts: 8 x 5"/25
Maximum speed: 33 Flotation: 18 Radar: 0
Belt armor: 3 Deck armor: 2
Primary turret armor: 2 Secondary turret armor: 0
Ship selection points: 38 Earliest yr. of availability: 1941

AMERICAN BATTLESHIP



BB SOUTH DAKOTA

Main guns: 9 x 16"/45 Secondary mounts: 16 x 5"/38
Maximum speed: 28 Flotation: 75 Radar: 2
Belt armor: 16 Deck armor: 6
Primary turret armor: 17 Secondary turret armor: 1
Ship selection points: 204 Earliest yr. of availability: 1942

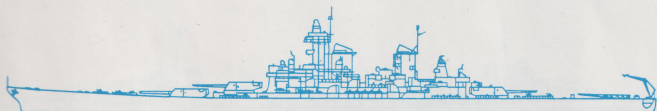
AMERICAN HEAVY CRUISER



CA PORTLAND

Main guns: 9 x 8"/55 Secondary mounts: 8 x 5"/25
Maximum speed: 33 Flotation: 20 Radar: 0
Belt armor: 4 Deck armor: 2
Primary turret armor: 2 Secondary turret armor: 0
Ship selection points: 41 Earliest yr. of availability: 1941

AMERICAN BATTLESHIP



BB IOWA

Main guns: 9 x 16"/50 Secondary mounts: 20 x 5"/38
Maximum speed: 33 Flotation: 95 Radar: 2
Belt armor: 16 Deck armor: 6
Primary turret armor: 18 Secondary turret armor: 1
Ship selection points: 224 Earliest yr. of availability: 1944

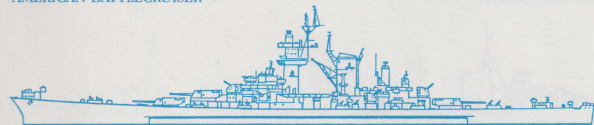
AMERICAN HEAVY CRUISER



CA NEW ORLEANS

Main guns: 9 x 8"/55 Secondary mounts: 8 x 5"/25
Maximum speed: 33 Flotation: 20 Radar: 0
Belt armor: 5 Deck armor: 2
Primary turret armor: 6 Secondary turret armor: 0
Ship selection points: 46 Earliest yr. of availability: 1941

AMERICAN BATTLECRUISER



BC ALASKA

Main guns: 9 x 12"/50 Secondary mounts: 12 x 5"/38
Maximum speed: 33 Flotation: 60 Radar: 2
Belt armor: 9 Deck armor: 4
Primary turret armor: 13 Secondary turret armor: 1
Ship selection points: 125 Earliest yr. of availability: 1944

AMERICAN HEAVY CRUISER



CA BALTIMORE

Main guns: 9 x 8"/55 Secondary mounts: 12 x 5"/38
Maximum speed: 33 Flotation: 30 Radar: 0
Belt armor: 6 Deck armor: 2
Primary turret armor: 6 Secondary turret armor: 1
Ship selection points: 57 Earliest yr. of availability: 1944

AMERICAN HEAVY CRUISER



CA PENSACOLA

Main guns: 10 x 8"/55 Secondary mounts: 8 x 5"/25
Maximum speed: 33 Flotation: 18 Radar: 0
Belt armor: 3 Deck armor: 2
Primary turret armor: 2 Secondary turret armor: 0
Ship selection points: 40 Earliest yr. of availability: 1941

AMERICAN LIGHT CRUISER



CL OMAHA

Main guns: 12 x 6"/53 Secondary mounts: 6 x 15 TT
Maximum speed: 33 Flotation: 14 Radar: 0
Belt armor: 4 Deck armor: 2
Primary turret armor: 4 Secondary turret armor: 0
Ship selection points: 34 Earliest yr. of availability: 1941



CL BROOKLYN

Main guns: 15 x 6"/47 **Secondary mounts:** 8 x 5"/25
Maximum speed: 33 **Flotation:** 20 **Radar:** 2
Belt armor: 5 **Deck armor:** 2
Primary turret armor: 6 **Secondary turret armor:** 0
Ship selection points: 48 **Earliest yr. of availability:** 1941

AMERICAN LIGHT CRUISER



CL CLEVELAND

Main guns: 12 x 6"/47 **Secondary mounts:** 12 x 5"/38
Maximum speed: 33 **Flotation:** 24 **Radar:** 2
Belt armor: 5 **Deck armor:** 2
Primary turret armor: 6 **Secondary turret armor:** 1
Ship selection points: 50 **Earliest yr. of availability:** 1943

AMERICAN ANTI-AIRCRAFT CRUISER



CLAA ATLANTA

Main guns: 16 x 5"/38 **Secondary mounts:** 8 x 15 TT
Maximum speed: 33 **Flotation:** 14 **Radar:** 1
Belt armor: 4 **Deck armor:** 2
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 28 **Earliest yr. of availability:** 1941

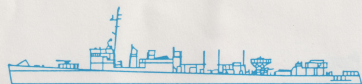
AMERICAN ANTI-AIRCRAFT CRUISER



CLAA OAKLAND

Main guns: 12 x 5"/38 **Secondary mounts:** 8 x 15 TT
Maximum speed: 33 **Flotation:** 14 **Radar:** 2
Belt armor: 4 **Deck armor:** 2
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 26 **Earliest yr. of availability:** 1944

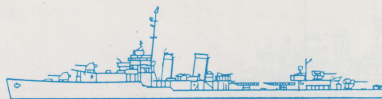
AMERICAN DESTROYER



DD FLUSH DECK

Main guns: 4 x 4"/45 **Secondary mounts:** 12 x 15 TT
Maximum speed: 35 **Flotation:** 3 **Radar:** 0
Belt armor: 0 **Deck armor:** 0
Primary turret armor: 0 **Secondary turret armor:** 0
Ship selection points: 8 **Earliest yr. of availability:** 1941

AMERICAN DESTROYER



DD FARRAGUT

Main guns: 5 x 5"/38 **Secondary mounts:** 8 x 15 TT
Maximum speed: 36 **Flotation:** 4 **Radar:** 0
Belt armor: 1 **Deck armor:** 0
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 9 **Earliest yr. of availability:** 1941

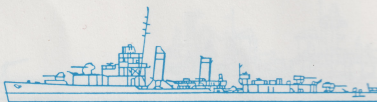
AMERICAN DESTROYER



DD PORTER

Main guns: 8 x 5"/38 **Secondary mounts:** 8 x 15 TT
Maximum speed: 37 **Flotation:** 5 **Radar:** 0
Belt armor: 1 **Deck armor:** 0
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 11 **Earliest yr. of availability:** 1941

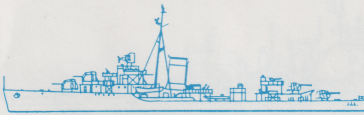
AMERICAN DESTROYER



DD MAHAN

Main guns: 4 x 5"/38 **Secondary mounts:** 12 x 15 TT
Maximum speed: 36 **Flotation:** 4 **Radar:** 0
Belt armor: 1 **Deck armor:** 0
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 9 **Earliest yr. of availability:** 1941

AMERICAN DESTROYER



DD CRAVEN

Main guns: 4 x 5"/38 **Secondary mounts:** 16 x 15 TT
Maximum speed: 38 **Flotation:** 4 **Radar:** 0
Belt armor: 1 **Deck armor:** 0
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 10 **Earliest yr. of availability:** 1941

AMERICAN DESTROYER



DD BENSON

Main guns: 4 x 5"/38 **Secondary mounts:** 5 x 15 TT
Maximum speed: 35 **Flotation:** 5 **Radar:** 0
Belt armor: 1 **Deck armor:** 0
Primary turret armor: 1 **Secondary turret armor:** 0
Ship selection points: 9 **Earliest yr. of availability:** 1941

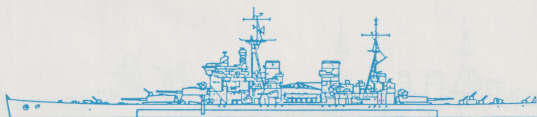
AMERICAN DESTROYER



DD FLETCHER

Main guns: 5 x 5"/38 Secondary mounts: 10 x 15 TT
Maximum speed: 38 Flotation: 6 Radar: 1
Belt armor: 1 Deck armor: 0
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 11 Earliest yr. of availability: 1942

BRITISH BATTLESHIP



BB KING GEORGE V

Main guns: 10 x 14"/45 Secondary mounts: 16 x 5.25"/50
Maximum speed: 28 Flotation: 70 Radar: 1
Belt armor: 15 Deck armor: 6
Primary turret armor: 13 Secondary turret armor: 2
Ship selection points: 163 Earliest yr. of availability: 1941

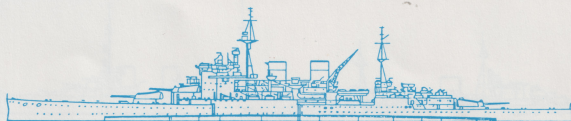
AMERICAN DESTROYER



DD GEARING

Main guns: 6 x 5"/38 Secondary mounts: 10 x 15 TT
Maximum speed: 37 Flotation: 6 Radar: 2
Belt armor: 1 Deck armor: 0
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 12 Earliest yr. of availability: 1945

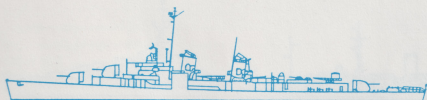
BRITISH BATTLESHIP



BB REPULSE

Main guns: 6 x 15"/42 Secondary mounts: 20 x 4"/50
Tertiary mounts: 8 x IX TT Maximum speed: 28
Flotation: 65 Radar: 1 Belt armor: 9 Deck armor: 4
Primary turret armor: 11 Secondary turret armor: 1
Ship selection points: 129 Earliest yr. of availability: 1941

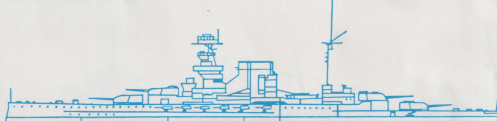
AMERICAN DESTROYER



DD SUMNER

Main guns: 6 x 5"/38 Secondary mounts: 10 x 15 TT
Maximum speed: 36 Flotation: 6 Radar: 2
Belt armor: 1 Deck armor: 0
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 12 Earliest yr. of availability: 1944

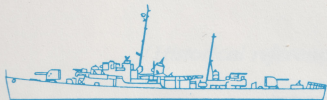
BRITISH BATTLESHIP



BB WARSPITE

Main guns: 8 x 15"/42 Secondary mounts: 8 x 6"/45
Tertiary mounts: 8 x 4"/45 Maximum speed: 24
Flotation: 65 Radar: 0 Belt armor: 13 Deck armor: 4
Primary turret armor: 11 Secondary turret armor: 2
Ship selection points: 142 Earliest yr. of availability: 1941

AMERICAN DESTROYER ESCORT



DE RUDDEROW

Main guns: 2 x 5"/38 Secondary mounts: 3 x 15 TT
Maximum speed: 23 Flotation: 4 Radar: 1
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 5 Earliest yr. of availability: 1944

BRITISH BATTLESHIP



BB REVENGE

Main guns: 8 x 15"/42 Secondary mounts: 14 x 6"/45
Maximum speed: 21 Flotation: 65 Radar: 0
Belt armor: 13 Deck armor: 4
Primary turret armor: 11 Secondary turret armor: 2
Ship selection points: 142 Earliest yr. of availability: 1941

BRITISH BATTLESHIP



BB NELSON

Main guns: 9 x 16"/45 Secondary mounts: 12 x 6"/50
Tertiary mounts: 6 x 4.7"/45 Maximum speed: 23
Flotation: 70 Radar: 1 Belt armor: 14 Deck armor: 6
Primary turret armor: 15 Secondary turret armor: 2
Ship selection points: 197 Earliest yr. of availability: 1941

BRITISH HEAVY CRUISER



CA AUSTRALIA

Main guns: 8 x 8"/50 Secondary mounts: 8 x 4"/45
Tertiary mounts: 8 x VIII TT Maximum speed: 32
Flotation: 22 Radar: 0 Belt armor: 4 Deck armor: 2
Primary turret armor: 2 Secondary turret armor: 0
Ship selection points: 42 Earliest yr. of availability: 1941

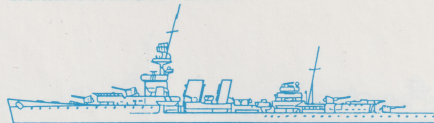
BRITISH HEAVY CRUISER



CA EXETER

Main guns: 6 x 8"/50 Secondary mounts: 8 x 4"/45
Tertiary mounts: 6 x IX TT Maximum speed: 32
Flotation: 18 Radar: 0 Belt armor: 3 Deck armor: 2
Primary turret armor: 2 Secondary turret armor: 0
Ship selection points: 35 Earliest yr. of availability: 1941

BRITISH ANTI-AIRCRAFT CRUISER



CLAA CARLISLE

Main guns: 8 x 4"/45 Maximum speed: 30
Flotation: 10 Radar: 0 Belt armor: 3 Deck armor: 1
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 17 Earliest yr. of availability: 1941

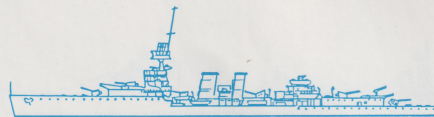
BRITISH LIGHT CRUISER



CL LEANDER

Main guns: 8 x 6"/50 Secondary mounts: 8 x 4"/45
Tertiary mounts: 8 x VII TT Maximum speed: 33
Flotation: 18 Radar: 0 Belt armor: 3 Deck armor: 2
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 33 Earliest yr. of availability: 1941

BRITISH LIGHT CRUISER



CL DANAE

Main guns: 6 x 6"/50 Secondary mounts: 12 x IX TT
Maximum speed: 30 Flotation: 10 Radar: 0
Belt armor: 3 Deck armor: 1
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 20 Earliest yr. of availability: 1941

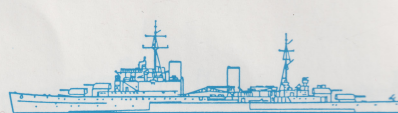
BRITISH LIGHT CRUISER



CL ENTERPRISE

Main guns: 6 x 6"/50 Secondary mounts: 4 x 4"/45
Tertiary mounts: 8 x IX TT Maximum speed: 33
Flotation: 18 Radar: 0 Belt armor: 3 Deck armor: 1
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 28 Earliest yr. of availability: 1941

BRITISH LIGHT CRUISER



CL FIJI

Main guns: 12 x 6"/50 Secondary mounts: 8 x 4"/45
Tertiary mounts: 6 x IX TT Maximum speed: 32
Flotation: 18 Radar: 1 Belt armor: 3 Deck armor: 2
Primary turret armor: 2 Secondary turret armor: 1
Ship selection points: 38 Earliest yr. of availability: 1941

BRITISH LIGHT CRUISER

(Historical reference not available)

CL ADELAIDE

Main guns: 7 x 6"/50 Secondary mounts: 2 x 4"/45
Maximum speed: 24 Flotation: 12 Radar: 0
Belt armor: 3 Deck armor: 1
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 21 Earliest yr. of availability: 1941

BRITISH ANTI-AIRCRAFT CRUISER



CLAA DIDO

Main guns: 10 x 5.25"/50 Secondary mounts: 6 x IX TT
Maximum speed: 32 Flotation: 12 Radar: 1
Belt armor: 3 Deck armor: 2
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 23 Earliest yr. of availability: 1941

BRITISH LIGHT CRUISER



CL CALEDON

Main guns: 5 x 6"/50 Secondary mounts: 2 x 4"/45
Tertiary mounts: 8 x IX TT Maximum speed: 30
Flotation: 10 Radar: 0 Belt armor: 3 Deck armor: 1
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 19 Earliest yr. of availability: 1941

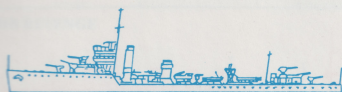
BRITISH DESTROYER



DD SABRE

Main guns: 3 x 4"/45 Secondary mounts: 4 x IX TT
Maximum speed: 36 Flotation: 3 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 6 Earliest yr. of availability: 1941

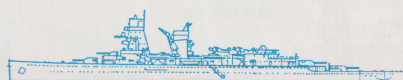
BRITISH DESTROYER



DD VAMPIRE

Main guns: 4 x 4"/45 Secondary mounts: 6 x IX TT
Maximum speed: 36 Flotation: 4 Radar: 0
Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 7 Earliest yr. of availability: 1941

DUTCH LIGHT CRUISER



CL DE RUYTER

Main guns: 7 x 6"/50 Maximum speed: 32
Flotation: 12 Radar: 0 Belt armor: 2 Deck armor: 1
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 20 Earliest yr. of availability: 1941

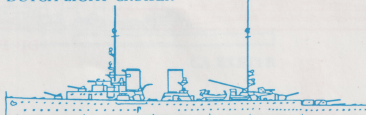
BRITISH DESTROYER

(Historical reference not available)

DD ELECTRA

Main guns: 4 x 4.7"/45 Secondary mounts: 8 x IX TT
Maximum speed: 36 Flotation: 4 Radar: 0
Belt armor: 1 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 8 Earliest yr. of availability: 1941

DUTCH LIGHT CRUISER



CL JAVA

Main guns: 10 x 6"/50 Maximum speed: 30
Flotation: 13 Radar: 0 Belt armor: 3 Deck armor: 1
Primary turret armor: 2 Secondary turret armor: 0
Ship selection points: 26 Earliest yr. of availability: 1941

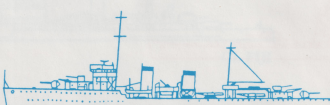
BRITISH DESTROYER



DD JUPITER

Main guns: 6 x 4.7"/45 Secondary mounts: 10 x IX TT
Maximum speed: 36 Flotation: 5 Radar: 0
Belt armor: 1 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 11 Earliest yr. of availability: 1941

DUTCH DESTROYER



DD VAN GHENT

Main guns: 4 x 4.7"/45 Secondary mounts: 6 x VII TT
Maximum speed: 36 Flotation: 4 Radar: 0
Belt armor: 1 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 8 Earliest yr. of availability: 1941

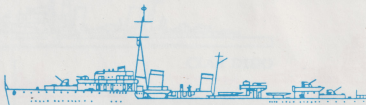
BRITISH DESTROYER

(Historical reference not available)

DD BATTLE

Main guns: 4 x 4.5"/45 Secondary mounts: 8 x IX TT
Maximum speed: 35 Flotation: 6 Radar: 2
Belt armor: 1 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 10 Earliest yr. of availability: 1945

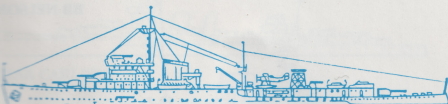
DUTCH DESTROYER



DD SWEERS

Main guns: 5 x 4.7"/45 Secondary mounts: 8 x VII TT
Maximum speed: 37 Flotation: 5 Radar: 0
Belt armor: 1 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 10 Earliest yr. of availability: 1941

DUTCH LIGHT CRUISER



CL TROMP

Main guns: 6 x 6"/50 Secondary mounts: 6 x VII TT
Maximum speed: 33 Flotation: 8 Radar: 0
Belt armor: 2 Deck armor: 1
Primary turret armor: 1 Secondary turret armor: 0
Ship selection points: 18 Earliest yr. of availability: 1941

CARGO SHIP (ALL NAVIES)



AK TRANSPORT

Main guns: 2 x 3"/60 Maximum speed: 15
Flotation: 10 Radar: 0 Belt armor: 0 Deck armor: 0
Primary turret armor: 0 Secondary turret armor: 0
Ship selection points: 20 Earliest yr. of availability: 1941

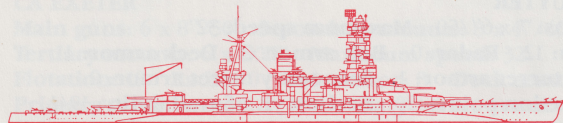
SHIP DRAWINGS IN RELATIVE SCALE



BB YAMATO



CL KITAKAMI



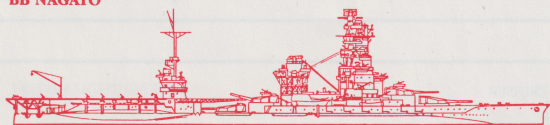
BB NAGATO



DD KAGERO



CL TENRYU



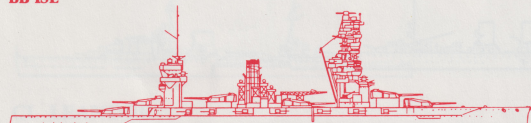
BB ISE



DD FUBUKI



CL YUBARI



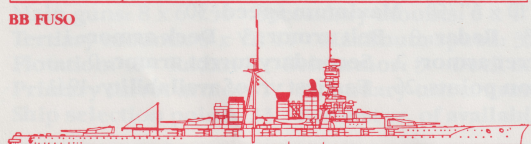
BB FUSO



DD SHIMAKAZE



DD AKIZUKI



BB KONGO



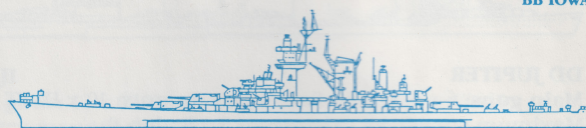
CA TAKAO



BB IOWA



CA TONE



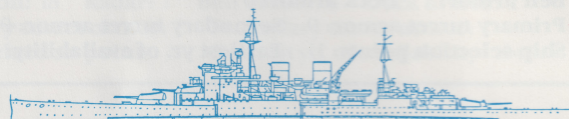
BC ALASKA



CA MOGAMI



DE MINEKAZE



BB REPULSE



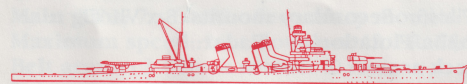
CL OYODO



DE MUTSU



BB KING GEORGE



CA AOBA



DD MUTSUKI



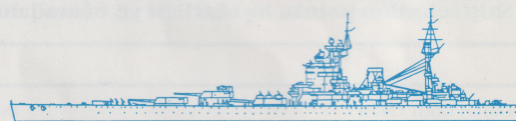
BB NORTH CAROLINA



CL AGANO



DD HATSU HARU



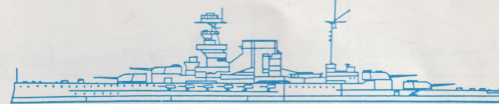
BB NELSON



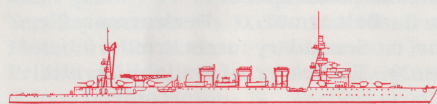
CL NAGARA



DD KAMIKAZE



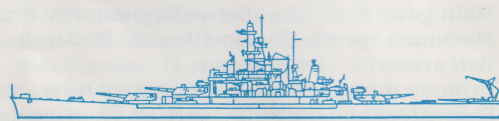
BB WARSPITE



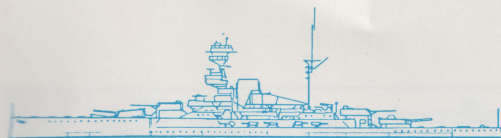
CL KUMA



DD SHIRATSUYU



BB SOUTH DAKOTA



BB REVENGE



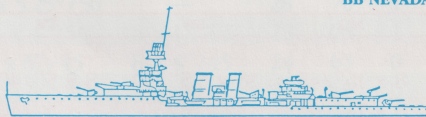
BB NEVADA



DD PORTER



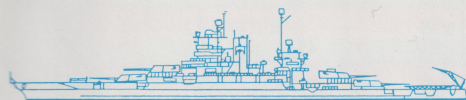
CA BALTIMORE



CL DANAE



DD FLETCHER



BB NEW MEXICO



CA NEW ORLEANS



DD GEARING



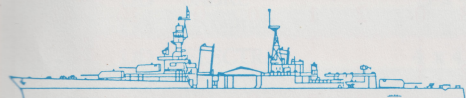
CA AUSTRALIA



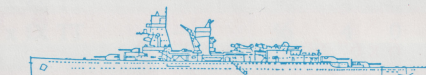
CA EXETER



DD MAHAN



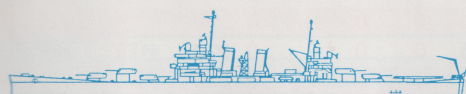
CA PORTLAND



CL DE RUYTER



DD FARRAGUT



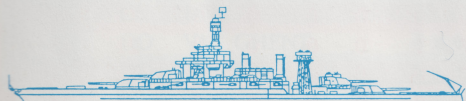
CL BROOKLYN



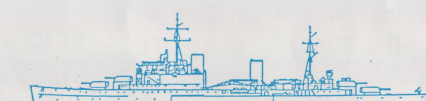
CL LEANDER



DD BENSON



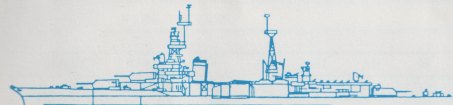
BB MARYLAND



CL FIJI



DD JUPITER



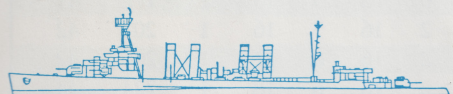
CA NORTHAMPTON



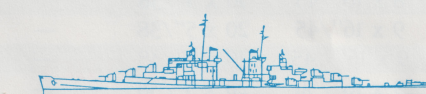
CLAA OAKLAND



DD SWEERS



CL OMAHA



CLAA ATLANTA



DD CRAVEN



CL CLEVELAND



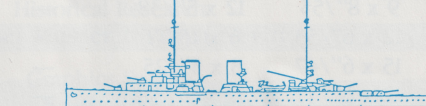
CLAA DIDO



DD FLUSH DECK



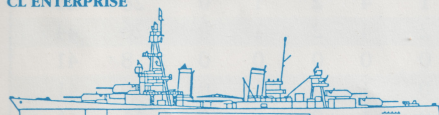
CL ENTERPRISE



CL JAVA



DD SABRE



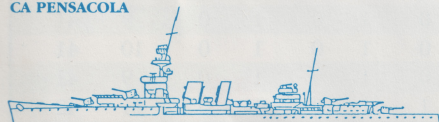
CA PENSACOLA



AK TRANSPORT



DD VAMPIRE



CLAA CARLISLE



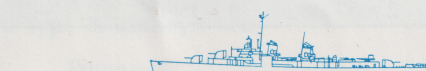
CL TROMP



DD VAN GHENT



CL CALEDON



DD SUMNER



DE RUDDEROW

SHIP DATA CHART

JAPANESE

TYPE	CLASS	MG	SM	TM	SP	FL	R	BA	DA	TA	STA	SSP	YEAR
BB	YAMATO	9 x 18.1"/45	12 x 6"/60	12 x 5"/40	27	125	0	16	9	24	2	250	42
BB	NAGATO	8 x 16"/45	16 x 5.5"/50	8 x 5"/40	27	80	0	12	4	14	5	175	41
BB	KONGO	8 x 14"/45	16 x 6"/50	8 x 5"/40	30	70	0	8	4	9	3	133	41
BB	FUSO	12 x 14"/45	14 x 6"/50	8 x 5"/40	24	70	0	12	4	12	4	161	41
BB	ISE	8 x 14"/45	16 x 5"/50	—	24	70	0	12	4	12	1	136	44
CA	AOBA	6 x 8"/50	4 x 4.7"/45	8 x 93 TT	33	20	0	3	2	4	0	38	41
CA	TONE	8 x 8"/50	8 x 5"/40	12 x 93 TT	35	28	0	4	2	4	0	52	41
CA	TAKAO	10 x 8"/50	8 x 5"/40	16 x 93 TT	34	30	0	4	2	4	0	58	41
CA	MOGAMI	10 x 8"/50	8 x 5"/40	12 x 93 TT	35	28	0	4	2	4	0	55	41
CL	TENRYU	4 x 5.5"/50	6 x 6 TT	—	33	9	0	2	1	0	0	16	41
CL	KUMA	7 x 5.5"/50	8 x 93 TT	—	33	11	0	2	1	0	0	23	41
CL	KITAKAMI	4 x 5.5"/50	40 x 93 TT	—	33	11	0	2	1	0	0	44	41
CL	NAGARA	7 x 5.5"/50	8 x 93 TT	—	36	11	0	2	1	0	0	23	41
CL	YUBARI	6 x 5.5"/50	4 x 93 TT	—	35	8	0	2	1	0	0	16	41
CL	AGANO	6 x 6"/60	4 x 3"/60	8 x 93 TT	35	15	1	2	1	1	0	26	43
CL	OYODO	6 x 6"/60	8 x 3.9"/60	—	36	22	1	2	1	1	0	31	44
DD	MINEKAZE	2 x 4.7"/50	2 x 6 TT	—	36	3	0	0	0	0	0	5	41
DD	KAMIKAZE	3 x 4.7"/50	6 x 6 TT	—	36	3	0	0	0	0	0	7	41
DD	MUTSUKI	2 x 4.7"/50	6 x 93 TT	—	33	4	0	0	0	0	0	9	41
DD	FUBUKI	6 x 5"/50	9 x 93 TT	—	38	5	0	0	0	0	0	15	41
DD	HATSU HARU	5 x 5"/50	6 x 93 TT	—	33	4	0	0	0	0	0	11	41
DD	SHIRATSUYU	5 x 5"/50	8 x 93 TT	—	34	5	0	0	0	0	0	14	41
DD	KAGERO	6 x 5"/50	8 x 93 TT	—	35	6	0	0	0	0	0	15	41
DD	SHIMAKAZE	6 x 5"/50	15 x 93 TT	—	39	7	1	0	0	0	0	21	43
DD	AKIZUKI	8 x 3.9"/65	4 x 93 TT	—	33	7	0	0	0	0	0	14	42
DE	MUTSU	3 x 5"/50	4 x 93 TT	—	27	4	0	0	0	0	0	8	44

AMERICAN

TYPE	CLASS	MG	SM	TM	SP	FL	R	BA	DA	TA	STA	SSP	YEAR
BB	NEVADA	10 x 14"/45	12 x 5"/51	8 x 5"/25	21	60	0	13	4	16	1	146	41
BB	NEW MEXICO	12 x 14"/50	8 x 5"/38	—	22	65	0	14	6	16	1	161	41
BB	MARYLAND	8 x 16"/45	16 x 5"/38	—	21	70	0	16	5	16	1	172	41
BB	NORTH CAROLINA	9 x 16"/45	20 x 5"/38	—	28	75	2	16	5	16	1	201	42
BB	SOUTH DAKOTA	9 x 16"/45	16 x 5"/38	—	28	75	2	16	6	17	1	204	42
BB	IOWA	9 x 16"/50	20 x 5"/38	—	33	95	2	16	6	18	1	224	44
BC	ALASKA	9 x 12"/50	12 x 5"/38	—	33	60	2	9	4	13	1	224	44
CA	PENSACOLA	10 x 8"/55	8 x 5"/25	—	33	18	0	3	2	2	0	40	41
CA	NORTHAMPTON	9 x 8"/55	8 x 5"/25	—	33	18	0	3	2	2	0	38	41
CA	PORTLAND	9 x 8"/55	8 x 5"/25	—	33	20	0	4	2	2	0	41	41
CA	NEW ORLEANS	9 x 8"/55	8 x 5"/25	—	33	20	0	5	2	6	0	46	41
CA	BALTIMORE	9 x 8"/55	12 x 5"/38	—	33	30	0	6	2	6	1	57	44
CL	OMAHA	12 x 6"/53	6 x 15 TT	—	33	14	0	4	2	4	0	34	41
CL	BROOKLYN	15 x 6"/47	8 x 5"/25	—	33	20	2	5	2	6	0	48	41
CL	CLEVELAND	12 x 6"/47	12 x 5"/38	—	33	24	2	5	2	6	1	50	43
CLAA	ATLANTA	16 x 5"/38	8 x 15 TT	—	33	14	1	4	2	1	0	28	41
CLAA	OAKLAND	12 x 5"/38	8 x 15 TT	—	33	14	2	4	2	1	0	26	44
DD	FLUSH DECK	4 x 4"/45	12 x 15 TT	—	35	3	0	0	0	0	0	8	41
DD	FARRAGUT	5 x 5"/38	8 x 15 TT	—	36	4	0	1	0	1	0	9	41
DD	PORTER	8 x 5"/38	8 x 15 TT	—	37	5	0	1	0	1	0	11	41
DD	MAHAN	4 x 5"/38	12 x 15 TT	—	36	4	0	1	0	1	0	9	41
DD	CRAVEN	4 x 5"/38	16 x 15 TT	—	38	4	0	1	0	1	0	10	41
DD	BENSON	4 x 5"/38	5 x 15 TT	—	35	5	0	1	0	1	0	9	41
DD	FLETCHER	5 x 5"/38	10 x 15 TT	—	38	6	1	1	0	1	0	11	42
DD	GEARING	6 x 5"/38	10 x 15 TT	—	37	6	2	1	0	1	0	12	45
DD	SUMNER	6 x 5"/38	10 x 15 TT	—	36	6	2	1	0	1	0	12	44
DE	RUDDEROW	2 x 5"/38	3 x 15 TT	—	23	4	1	0	0	0	0	5	44

MG = Main guns SM = Secondary mounts TM = Tertiary mounts SP = Maximum speed FL = Flotation R = Radar BA = Belt armor DA = Deck armor
 TA = Primary turret armor STA = Secondary turret armor SSP = Ship selection points YEAR = Earliest year of availability
 TT = Torpedo tubes 6 TT = Type 6 93 TT = Type 93 VII TT = Mk-VII IX TT = Mk-IX 15 TT = Mk-15

BRITISH

TYPE	CLASS	MG	SM	TM	SP	FL	R	BA	DA	TA	STA	SSP	YEAR
BB	NELSON	9 x 16"/45	12 x 6"/50	6 x 4.7"/45	23	70	1	14	6	15	2	197	41
BB	KING GEORGE V	10 x 14"/45	16 x 5.25"/50	—	28	70	1	15	6	13	2	163	41
BB	REPULSE	6 x 15"/42	20 x 4"/50	8 x IX TT	28	65	1	9	4	11	1	129	41
BB	WARSPITE	8 x 15"/42	8 x 6"/45	8 x 4"/45	24	65	0	13	4	11	2	142	41
BB	REVENGE	8 x 15"/42	14 x 6"/45	—	21	65	0	13	4	11	2	142	41
CA	AUSTRALIA	8 x 8"/50	8 x 4"/45	8 x VII TT	32	22	0	4	2	2	0	42	41
CA	EXETER	6 x 8"/50	8 x 4"/45	6 x IX TT	32	18	0	3	2	2	0	35	41
CL	LEANDER	8 x 6"/50	8 x 4"/45	8 x VII TT	33	18	0	3	2	1	0	33	41
CL	ENTERPRISE	6 x 6"/50	4 x 4"/45	8 x IX TT	33	18	0	3	1	1	0	28	41
CL	ADELAIDE	7 x 6"/50	2 x 4"/45	—	24	12	0	3	1	1	0	21	41
CL	CALEDON	5 x 6"/50	2 x 4"/45	8 x IX TT	30	10	0	3	1	1	0	19	41
CLAA	CARLISLE	8 x 4"/45	—	—	30	10	0	3	1	1	0	17	41
CL	DANAE	6 x 6"/50	12 x IX TT	—	30	10	0	3	1	1	0	20	41
CL	FIJI	12 x 6"/50	8 x 4"/45	6 x IX TT	32	18	1	3	2	2	1	38	41
CLAA	DIDO	10 x 5.25"/50	6 x IX TT	—	32	12	1	3	2	1	0	23	41
DD	SABRE	3 x 4"/45	4 x IX TT	—	36	3	0	0	0	0	0	6	41
DD	VAMPIRE	4 x 4"/45	6 x IX TT	—	36	4	0	0	0	0	0	7	41
DD	ELECTRA	4 x 4.7"/45	8 x IX TT	—	36	4	0	1	0	0	0	8	41
DD	JUPITER	6 x 4.7"/45	10 x IX TT	—	36	5	0	1	0	0	0	11	41
DD	BATTLE	4 x 4.5"/45	8 x IX TT	—	35	6	2	1	0	0	0	10	45

DUTCH

TYPE	CLASS	MG	SM	TM	SP	FL	R	BA	DA	TA	STA	SSP	YEAR
CL	TROMP	6 x 6"/50	6 x VII TT	—	33	8	0	2	1	1	0	18	41
CL	DE RUYTER	7 x 6"/50	—	—	32	12	0	2	1	1	0	20	41
CL	JAVA	10 x 6"/50	—	—	30	13	0	3	1	2	0	26	41
DD	VAN GHENT	4 x 4.7"/45	6 x VII TT	—	36	4	0	1	0	0	0	8	41
DD	SWEERS	5 x 4.7"/45	8 x VII TT	—	37	5	0	1	0	0	0	10	41

ALL

TYPE	CLASS	MG	SM	TM	SP	FL	R	BA	DA	TA	STA	SSP	YEAR
AK	TRANSPORT	2 x 3"/60	—	—	15	10	0	0	0	0	0	20	41

CREDITS

Game Design & Programming

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Game Development

Joel Billings

Historical Research

Michael Musser & Allyn Nevitt

Graphics System

Keith Brors

Playtesting

**Michael Musser, Tom Cheche, Jefferson Guy,
Arlon Harris, John Gray, Russ Smith, Bill Thompson,
George Kucera, Keith Brors & Jim McPherson**

Customized Disk Operating System (Apple version)

Roland Gustafsson

Art & Graphic Design

**Louis Hsu Saekow, David Boudreau,
Kathryn Lee & Ben Willemsen**

Typesetting

Abra Type & Kathryn Lee

Printing

A&a Printers and Lithographers

GUNFIRE ACCURACY MODIFIERS

FC	EFFECT	DESCRIPTION
all	add	target speed / 2
all	add	target turn* / 2
all	add	firer speed / 2
all	add	firer turn* / 2
V	add	10, if other ships firing at target
V	add	30, if ranging in
V	add	20, if visibility < 21; add 5 if firing ship is Japanese
	or	
V	add	30, if visibility < 7, add 15 if firing ship is Japanese
R	add	30, for radar fire control

AFTER ALL ADDITIONS HAVE BEEN MADE, THE FOLLOWING MULTIPLIERS MAY BE APPLIED:

all	×	1/2, if crossing the target ship's 'T'
all	×	(10 - RADAR) / 10, × 2 if fire control is KO'd
all	×	RANGE / GUN MAX RANGE
V	×	1/2, if ranged in

AFTER ALL MULTIPLIERS HAVE BEEN APPLIED:

all	add	5
all	add	5, if CA, CL, CLAA, AK target
all	add	25, if DD, DE target

V = visual fire control only

R = radar fire control only

GUN DATA CHART

ID	DESCRIPTION	SIZE	RANGE	PEN
6	18.1/45	35	46	26
7	16/50	30	42	26
8	16/45	27	40	25
9	15/42	22	32	23
10	14/50	18	36	23
11	14/45	18	38	23
12	12/50	14	33	17
13	8/55	6	31	9
14	8/50	6	30	8
15	6/60	4	30	7
16	6/53	4	26	7
17	6/50	4	20	7
18	6/47	4	26	7
19	6/45	4	18	7
20	5.5/50	4	19	5
21	5/51	3	13	5
22	5.25/50	4	22	5
23	5/50	3	20	4
24	5/40	3	16	4
25	5/38	3	17	4
26	5/25	3	14	4
27	4.7/45	3	16	4
28	4.7/50	3	18	4
29	4.5/45	3	17	4
30	4/50	2	14	4
31	4/45	2	16	3
32	3.9/65	2	20	4
33	3.9/60	2	18	4
34	3/60	1	15	3

The gun description consists of two numbers: gun barrel size in inches / gun caliber. Numbers listed in the SIZE column represent the weight of the shell. Numbers listed in the RANGE column reflect the range of the gun in 1000s of yards. Numbers listed in the PEN column reflect the armor penetration effectiveness of the gun.

TORPEDO DATA CHART

ID	DESCRIPTION	SIZE	SPEED	RANGE
1	MK-IX	9	35/40	14/10
2	MK-15	8	25/40	14/6
3	MK-VII	9	33/38	16/11
4	TYPE 6	10	25/35	16/8
5	TYPE 93	20	35/50	45/22

The numbers listed in the size column represent the size of the torpedo warhead. There are two numbers listed for both the speed and range of the torpedo. The first number is the speed or range of the torpedo at the 'slow setting' and the second number is the speed or range of the torpedo at the 'fast setting'.



STRATEGIC SIMULATIONS, INC.

If you have any questions or problems regarding the program or game, please send a self-addressed, stamped envelope with your question to: STRATEGIC SIMULATIONS, INC., 1046 N. Rengstorff Avenue, Mountain View, CA 94043.

Or call our Hotline Number: (415) 964-1200 every weekday, 9 to 5 (P.S.T.).